CLAIMS

1. (Original) A method of manufacturing a silicon optoelectronic device comprising: preparing an n- or p-type silicon-based substrate;

forming a microdefect pattern along a surface of the substrate by etching;

forming a control film with an opening on the microdefect pattern; and

forming a doping region on the surface of the substrate having the microdefect pattern in such a way that a predetermined dopant of the opposite type to the substrate is injected onto the substrate through the opening of the control film to be doped to a depth so that a photoelectric conversion effect leading to light emission and/or reception by quantum confinement effect in a p-n junction occurs.

2. (Original) The method according to claim 1, wherein forming the microdefect pattern comprises:

forming a mask layer on the surface of the substrate;

forming openings of a desired size and period in the mask layer;

etching the surface of the substrate corresponding to the openings of the mask layer to form the microdefect pattern along the surface of the substrate; and removing the mask layer.

3. (Original) The method according to claim 2, wherein forming the openings of a desired size and period in the mask layer is carried out using a single probe- or a multi-probe having an array of a plurality of probes.

4. (Original) The method according to claim 3, wherein the probe is an atomic force microscopy (AFM) probe.

5. (Original) The method according to claim 1, wherein the control film is a silicon oxide film to allow the doping region to be formed to the depth such that a photoelectrical conversion effect by quantum confinement in the p-n junction 30 between the doped region and the substrate occurs.

6. (Original) The method according to claim 1, further comprising forming first and second electrodes on the substrate to be electrically connected to the doping region.

7. (Original) The method according to claim 1, wherein forming the doping region is carried out by non-equilibrium diffusion of the predetermined dopant.

8. (Original) The method according to claim 1, wherein the control film is selectively removed after the formation of the doping region.

9. (Original) The method according to claim 1, wherein the microdefect pattern has a period corresponding to the wavelength of light emitted and/or received.

10. (Original) The method according to claim 9, wherein the microdefect pattern is formed to a single period to emit and/or receive light of a single wavelength.

16. (Withdrawn) The silicon optoelectronic device according to claim 14, wherein when the microdefect pattern is formed to a plurality of microdefect pattern regions having different periods, the control film is formed with a plurality of openings corresponding to the periods, and a plurality of doping regions are formed through the openings, an array of a plurality of silicon optoelectronic devices that emit and/or receive light of a plurality of wavelengths is formed.

17. (Withdrawn) The silicon optoelectronic device according to claim 13, wherein the control film is selectively removed after the formation of the doping region.

18. (Withdrawn) A silicon optoelectronic device manufactured by the method according to claim 2.

19. (Withdrawn) The silicon optoelectronic device according to claim 18, wherein the microdefect pattern has a period corresponding to the wavelength of light emitted and/or received.

20. (Withdrawn) The silicon optoelectronic device according to claim 19, wherein the microdefect pattern is formed to a single period to emit and/or receive light of a single wavelength.

21. (Withdrawn) The silicon optoelectronic device according to claim 19, wherein when the microdefect pattern is formed to a plurality of microdefect pattern regions having different periods, the control film is formed with a plurality of

openings corresponding to the periods, and a plurality of doping regions are formed through the openings, an array of a plurality of silicon optoelectronic devices that emit and/or receive light of a plurality of wavelengths is formed.

22. (Withdrawn) The silicon optoelectronic device according to claim 18, wherein the control film is selectively removed after the formation of the doping region.

23. (Withdrawn) A silicon optoelectronic device manufactured by the method according to claim 6.

24. (Withdrawn) The silicon optoelectronic device according to claim 23, wherein the microdefect pattern has a period corresponding to the wavelength of light emitted and/or received.

25. (Withdrawn) The silicon optoelectronic device according to claim 24, wherein the microdefect pattern is formed to a single period to emit and/or receive light of a single wavelength.

26. (Withdrawn) The silicon optoelectronic device according to claim 24, wherein when the microdefect pattern is formed to a plurality of mirodefect pattern regions having different periods, the control film is formed with a plurality of openings corresponding to the periods, and a plurality of doping regions are formed through the openings, an array of a plurality of silicon optoelectronic devices that emit and/or receive light of a 15plurality of wavelengths is formed.

27. (Withdrawn) The silicon optoelectronic device according to claim 23, wherein the control film is selectively removed after the formation of the doping region.

28. (Withdrawn) An image input and/or output apparatus comprising a silicon optoelectronic device panel having a two-dimensional array of silicon optoelectronic devices, each of which inputs and/or outputs an image, formed on an n- or p-type silicon-based substrate,

each of the silicon optoelectronic devices comprising:

a microdefect pattern formed along a surface of the substrate by etching; and

a doping region formed on the surface of the substrate having the microdefect pattern using a predetermined dopant of the opposite type to the substrate to be doped to a depth so that a photoelectric conversion effect leading to light emission and/or reception by quantum confinement effect in a p-n junction occurs.

29. (Withdrawn) The image input and/or output apparatus according to claim 28, wherein the microdefect pattern is formed by forming a mask layer on the surface of the substrate; forming openings of a desired size and period in the mask layer; and etching the surface of the substrate corresponding to the openings of the mask layer.

30. (Withdrawn) The image input and/or output apparatus according to claim 28, wherein the microdefect pattern has a period corresponding to the wavelength of light emitted and/or received.

31. (Withdrawn) The image input and/or output apparatus according to claim 28, wherein when both input and output of an image are possible, some of the silicon optoelectronic devices input an image and the others of the silicon optoelectronic devices output an image.

32. (Withdrawn) The image input and/or output apparatus according to claim 28, wherein when both input and output of an image are possible, each of the silicon optoelectronic devices inputs and outputs an image.

33. (Withdrawn) The image input and/or output apparatus according to claim 28, wherein electrodes are patterned on the substrate to carry out the input and/or output of an image from the silicon optoelectronic device panel on a pixel-by-pixel basis.

34. (Withdrawn) The image input and/or output apparatus according to claim 28, wherein the silicon optoelectronic device panel comprises three or more of the silicon optoelectronic devices per each pixel.

35. (Withdrawn) The image input and/or output apparatus according to claim 34, wherein the three or more of the silicon optoelectronic devices corresponding to each pixel have microdefect patterns of different periods and emit and/or receive light of different wavelengths to represent a color image.